



## DEPARTMENT OF EDUCATION AND SPECIAL EDUCATION

# TEACHER CHARACTERISTICS AND CHOICES AND THEIR EFFECTS ON READING ACHIEVEMENT:

A COMPARISON BETWEEN SWEDEN AND QUEBEC

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## Abstract

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**Purpose.** The purpose of this study is to compare teacher and classroom factors that are believed to affect students' reading achievement scores at the fourth grade level by using PIRLS 2011 dataset. Teacher qualification and experience, along with how reading instruction is done, reading material used, time spent on reading during class time, socio-economic background of students, and school emphasis on academic success were included in the analysis.

**Theory.** The Coleman report (1966) about school segregation triggered the need to highlight teacher and classroom factors that are effective in helping student achieve acceptable reading levels. The *Dynamic Model of Educational Effectiveness* (Creemers and Kyriakides, 2008) provided the theoretical concepts on which the model of this study was constructed.

**Method.** Two two-level structural equation models were created for this study, one for Quebec, and one for Sweden. This allowed the possibility to compare the results and determine similarities and differences between the two jurisdictions.

**Results.** Students' socio-economic status (SES) was controlled at the student-level for the purpose of this study. Reading achievement is mainly explained by SES for both school systems. In Quebec, time spent across the curriculum is also directly significant. It is the choice of reading material that is significant in Sweden. Teacher qualifications seem to be predictive of teacher's instruction choices in Quebec but not as much in Sweden. The latter is more influenced by students' SES and the school's emphasis on academic success.

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## Introduction

Reading is a skill used on a daily basis in developed societies. People are required to read instructions, both verbally and as pictographs. They are faced with posters and advertisements wherever they go. Social-media requires people to use reading comprehension to keep in contact with their peers. People must read official documents and sign consent forms. Reading is an essential skill for interpersonal communication and social integration; although one may survive in a society without having excellent reading skills, reaching an acceptable level facilitates their functioning and participation.

Reading is among the first skills taught in formal schooling as it is used to teach other subjects in later years of education. Mullis, Martin and Foy (2013) examined how reading comprehension affected students' responses in the Trends in International Mathematics and Science Study (TIMSS). Since TIMSS, along with its sister study, the Progress in International Reading Literacy Study (PIRLS), both of which are administered by the International Association for the Evaluation of Educational Achievement (IEA), was conducted in 2011, it allowed researchers to analyse the data from both tests in conjunction with one another. By rating the TIMSS questions based on the level of reading difficulty (low, medium and difficult), the researchers used the PIRLS achievement scores to see if high achievers in PIRLS performed better on the difficult questions in TIMSS than the students who had performed more poorly on the PIRLS. The level of difficulty of the questions were assessed on the number of words used in the formulation of the question, the vocabulary, the symbolic language used, as well as the visual display of the text. Results revealed that the performance of the best readers was not affected by the reading level difficulty of the questions but the weaker students performed more poorly when the questions demanded a higher level of reading skills. The greatest difference was observed in mathematics. Although there was a difference in the performance between high and low reading achievers at all levels, the difference was even more remarkable as the questions required better reading skills.

Literature about learning difficulties often leads one to conclude that there is a relationship between students with learning difficulties and poor reading abilities (Lyon, 2002; Tomblin, Zhang, Buckwalter, & Catts, 2000). By gaining an understanding of reading educational systems, it is hoped that key elements of

becoming a successful or unsuccessful reader will be highlighted so that adjustments can be made. If students can become successful readers, it is possible that the amount of students with learning difficulties might be reduced.

Given the importance of reading ability in learning other subject knowledge and in individual's active participating in society, it is essential to understand the role that school system and classroom instruction may contribute to students' reading literacy development.

Even though educational equality and equal opportunity to learn are key goals in many school systems, it is very often noted that while students are expected to receive the same education, there are those who complete the curriculum without reaching the desired standard or achieving the same learning outcomes as their peers. Worryingly, some of these students fail to reach a fair level of proficiency with regards to reading. Based on the PIRLS results, there are still approximately 5% of the population that had not reached a low level of proficiency in reading by grade 4 (Mullis I. V., Martin, Foy, & Drucker, 2012). Five percent of the students still had difficulties locating and retrieving explicitly stated information in both literary and informative texts, yet they have reached a point in their education where they are expected to use their reading skills to learn about other subjects. Great variation is observed in reading achievement among individuals in different classrooms and schools as well as across countries in the international large-scale studies, such as PIRLS. In opposition to the students who have not reached a low level of proficiency, a significant proportion of students (up to 25% in some countries) are reaching high levels of proficiency. There is a large amount of the variation left unexplained after taking into account student's family background differences. This implies that other factors, such as teacher- and classroom-related factors, and differences across educational systems, may also explain some of the achievement differences.

Therefore in this thesis, two educational systems, i.e., the province of Quebec in Canada and Sweden, will be studied in order to gain a better understanding of the variation in students' reading achievement. With the use of PIRLS 2011 and multi-level analyses, it is hoped that main differences between the two territories will be found and useful implications for various educational stakeholders will be made. The majority of the studies using the Dynamic Model fail to integrate the classroom factors adequately (Scheerens, 2013). Thus, focusing on classroom level factors of

reading instruction in both Quebec and Sweden makes this study both timely and relevant.

Moreover, making use of the international assessments in a period where countries are battling to obtain recognition from other developed countries is interesting. Using data from PIRLS gives both the opportunity to gain better insight into multiple educational systems individually, and the ability to make comparative analyses, since the collected data is equivalent. Students from both countries are evaluated in the same year of schooling and strict translations of the texts have been made to create tests as similar as possible even though the languages of instruction and testing differ. As for the information gained through the questionnaires given to students and parents, most questions were the same worldwide, with a few adjustments that were made based on the context, particularly in regards to measuring a home's socio-economic status (with, for example, the various domestic goods judged to well-represent varying levels of socio-economic status being adapted to fit specific local standards of living). Thus, those few adaptations are important to note but through careful monitoring during the development process, they are still comparable if used in the correct context.

## **Background**

Currently, there is a multitude of educational systems, differing from one another at a national (and, in some cases local) level. Some of these systems are popularly seen to produce students who are reaching higher goals than others (Augustin, 2013; Coughlan, 2012; Friedman, 2013). Cultural differences may be the source of some differences in reading achievement, but the systems also share the common burden of preparing students properly for life. Focusing on different subjects more than others or prioritising various teaching techniques seems to play a role on students' learning (Mullis, Martin, & Foy, 2013). Different countries have different aims and goals. As Creemers and Kyriakides (2008) made reference to Kyriakides (1999), some countries' national curricula are precise and dictate daily activities whereas others are more guidelines. Therefore, it is of interest to analyse the inner workings of various educational systems in order to understand why students are achieving better in one than another. More specifically, why is Sweden achieving better than Quebec according to the PIRLS results when their political ideologies and

standard of living are very similar? Sweden's trends in reading achievement results have been decreasing over the past decade whereas Quebec's rates remain somewhat constant and even increased slightly between 2006 and 2011. Since the structure of Canada's federal government gives each Province and Territory jurisdiction over its own educational system, the current study will focus on Quebec's data rather than on the other provinces.

### **Reasoning for choosing Quebec and Sweden**

The choice of educational systems for inclusion in this project is primarily motivated by familiarity. As a Quebec native, the researcher has a working knowledge of the curriculum and its functionality from both a student and a teacher's perspective. Currently residing in Sweden and teaching in Swedish schools, she would like to gain a better understanding of the system with which she encounters regularly.

Additionally, Quebec was also a good choice for representing Canada in this study due to its linguistic situation. While Canada is a bilingual country and each province must offer educational services in both French and English to the population, Quebec is unique in that French is the majority language in both the local population and the school system. When looking at the results of all participating provinces, minority language schools (that is to say French language schools in most provinces) achieved at significantly lower levels than their majority language equivalents. Since the educational system should not favour one population group over the other, the researcher looked at which province had the most equilibrium between the French and English populations. Quebec was the only province where minority language (English) students reached almost the same level as the majority language (French) students.

Quebec and Sweden were chosen not only for the researcher's closeness with the two places, but also due to their similarities in their socio-cultural and economic statuses. Indeed, based on the information provided by the PIRLS 2006 international report (Mullis I. , Martin, Kennedy, & Foy, 2007, pp. 26-27), the population size of the two places are similar with a population of 7.6 million people in Quebec and 9 million inhabitants in Sweden. Although Quebec is roughly three times the size of Sweden, the urban density is still approximately the same: 80% and 83% for Quebec and Sweden respectively. The life expectancy is also very similar with an average of 79 years old in Quebec and 80 years old in Sweden. With regards to economic



statuses of individuals, the gross national income (GNI) per capita were almost the same, with Quebec having an advantage of only US\$946. Though, when analysing the purchasing power of the money, Sweden's GNI was lower (US\$26,710) in comparison with Quebec (US\$28,940). Both Quebec and Sweden have 100% enrollment in primary education, and there are an average of 15 students per teacher in Quebec whereas Sweden has an average of 12 students. Quebec spends 8% of their budget on education (at all levels) and Sweden spends 7%.

### **General educational context in both countries**

The following section is based on the information given by the National Coordinators of the PIRLS 2011 for both countries. The educational context is similar in both countries but there are differences. One of the first differences lies in the age at which students start attending school. In Quebec, students are obliged to start attending school if they are aged six by September 30<sup>th</sup> of the school year, whereas students start school during the year of their seventh birthday in Sweden. In both countries, most students attend a kindergarten class the year before to prepare them for schooling. Moreover, Sweden offers subsidised daycare to every child aged one if desired. In Quebec, early entry to kindergarten or pre-kindergarten classes is offered to some students with a low socio-economic status. Both countries require students to attend school until they reach 16.

Swedish students are expected to attend compulsory school (grades 1-9) and high school (3 years). In Quebec, students usually have eleven years in school; six years in elementary school and five years in secondary school. Each school year is composed of 178 school days and 180 days respectively in Sweden and Quebec. PIRLS 2011 measured the performance of children with four years of education, which in the structure of the two systems investigated puts the students of Quebec slightly older than in Sweden at the time of assessment.

The way most teachers enter the teaching profession, for elementary teaching, is very similar in both countries. Both countries expect their teachers to have obtained an undergraduate degree from a qualified university. In Sweden, teachers are required to have a full semester practicum, whereas in Quebec, teachers have to do four practicums which last three months each during their teacher education. After teachers have completed their studies, but both countries explain that although not obligatory,

many schools offer a mentoring programme to facilitate new teachers' integration in their workplace.

Documents are provided by the education ministries of both jurisdictions in order to help teachers follow and implement the curriculum. Both have an official document for the curriculum. In addition to this document, Quebec offers specially designed activities teachers can use. Sweden offers additional ministry notes and directives and other documents to help teachers interpret the syllabus and assess students correctly. While both systems have integrated reading into the language arts curriculum, the reading modules are more specific than other areas of the curriculum, thus leading to more differences between the two territories' written curricula.

According to the questionnaire completed at the national level, Sweden does not have a fixed amount of hours set specifically for language instruction. It is left to teachers to determine how they would like to fill their teaching time based on their knowledge of their group and the time needed for them to attain the curricular goals.

In contrast to Sweden, Quebec's curriculum mandates that 28% of teaching time should be devoted to language instruction. This means that students should receive instruction of their first language for a minimum of seven hours per week (including reading, writing, speaking, listening, etc.). Second language instruction is given more liberty since no minimum is required per school year.

Both countries' curricula were reviewed around the turn of the millennium; Sweden in 2000 and Quebec in 2001. That being said, Sweden was in the process of reviewing its curriculum when the PIRLS 2011 test was conducted due to perceived poor performances in previous international tests in which the country participated. The new curriculum was put in place in August 2011. It is important to mention this as the Swedish results reflect the characteristics of the LPO 94 curriculum that are reviewed and may differ from today's situation.

### **Reading curriculum in Sweden**

The general goals of the school, according to the curriculum (Skolverket, n.d.), is that every student may develop their knowledge of the Swedish language both through writing and oral communication. They should have the opportunity to develop their creativity and develop an interest to partake in the cultural heritage, especially the Swedish culture but also the Nordic and Western European one. They should be able to use the knowledge gained in a variety of methods such as through

writing and arts. They should understand the role of media and be able to use ICTs (Skolverket, n.d.). Other goals such as basic knowledge of mathematical or scientific terms were also included but omitted in this discussion due to the lack of relevance to the research question.

As it is stated in LPO 94 curriculum (Skolverket, n.d.), language is presented, alongside literature, as having a big meaning in the development of students' personal identities. The language programme has as a goal to help students develop their ability to communicate, think and develop their creativity. Can students use the language to create meaning? The programme is made to prepare students for society; a society where students need to be able to handle, understand, and evaluate texts. They need to be critical readers. Moreover, language is merely a formation of sounds and patterns but it is also a cultural bearer. Through language, a country's history and culture can be taught and learnt. The opportunity to embrace various cultural aspects through a diversity of texts such as novels, plays, and films is an important aspect of the curriculum.

The guidelines given by the curriculum allow students to become independent critical readers (Skolverket, n.d.). The language programme is built so students can read literature as a group and read texts matching their own interests individually in order to develop their imagination and desire to learn. They should be able to respond to texts with various purposes by expressing their thoughts and feelings. It is necessary for students to be able to evaluate them and through discussions with others, reflect over the texts. Students are also required to be able to read, understand, interpret and experience different genres and adapt their reading and work to the purpose of the text.

The Swedish culture, as well as the one from the Nordic countries and other parts of the world, is also vital in the language programme. The Sami language and other minority languages of Sweden should also be put forth. As it is one of the main goals of the overall curriculum, the language programme should provide students with opportunities to understand the cultures. This can be achieved through various fictional texts and authors from around the world. It should also provide opportunities to acquire knowledge about the Swedish language system and how it developed. Why do people write and talk differently based on where they come from? According to the prescribed curriculum, students should be able to have perspective on that question and be able to reflect upon it (Skolverket, n.d.).

The curriculum requires students to not only gather information, but also use it appropriately and understand its meaning (Skolverket, n.d.). As previously said, students are expected to become critical partakers in the society in which they live. To do so, students should see their own productions as a way of partaking in the cultural heritage in which they are surrounded. They are required to self-evaluate their progress and use their experiences, ideas, and language to construct meaning. The curriculum sees literature as an opportunity for students to experience similar feelings and thoughts which can lead them to discussion and development of meaning construction. Students can be required to work with a variety of texts such as drama, role plays, films, videos and study images. It also encourages students to experiment with the language and adapt it to various situations in order to promote students' ability to reflect, and think logically and critically (Skolverket, n.d.).

The curriculum states that through literary texts, students can experience new dimensions of life; especially fiction plays and films (Skolverket, n.d.). They allow students to experience humour, tragedy and happiness. They mimic people's lives. Literary texts help students create their identities and empathise with and understand others and differences around them. It gives students the opportunity to evaluate their values and attitudes towards a specific theme. Through literary texts, students can learn about crucial existential themes such as racism, extremism, gender stereotypes and undemocratic ideals. Moreover, literary texts give insight to how the people lived during a certain time period in various regions of the world. Through exchanges based on the literature and students' experiences, students can learn to reflect on life's existential questions. It also provides students the opportunity to develop their own cultural views and values.

The Swedish curriculum is made so that the goals are evaluated at certain points in their school trajectory rather than every year. Specific criteria as given for the end of grades three and five, as well as the last year of compulsory school, grade nine. With this in mind, students who took the PIRLS 2011 assessment should have met the requirements for third-grade and been progressing in the development of the grade five criteria.

As the coordinator of PIRLS in Sweden answered in the questionnaire, the third grade's criteria were added in 2008. By the end of third-grade, students should be able to read familiar texts fluently. They should be able to read fictional texts that are meaningful to them and retell the main events orally or in writing. Non-fiction

texts and instructions that are meaningful for the students should also not be a problem for them to understand. They should also be able to describe and use the information gained from the texts.

As expected, grade five goals are a continuity of grade three. Students are expected to be able to read fluently both aloud and quietly and understand the meaning and purpose of the reading. The reading theme should be aimed for children and teenagers. Students are also expected to express their experiences gained from the reading and reflect upon the texts through discussions. They should also understand the most common rules of the written language and be able to use a dictionary.

Although the word “strategy” is not used a single time in the curriculum, the evaluation criteria for the two highest grades (VG and MVG) lead the reader to understand that strategies should be used. It states that the student should work consciously with their language. The student should argue and ask questions. The student should adapt their reading to the purpose of the text and the student can compare their readings.

### **Reading curriculum in Quebec**

The curriculum for the English school system and the French system of Quebec are presented in slightly different ways to adapt to the language but the content and goal remains the same. The description that is made is taken from the English version that was officially approved in 2001. The French version was approved and printed in 2006.

Quebec has specific goals set for grade four. Since the six elementary years are divided into three two year cycles, grade four (or cycle 2, year 2 as it is officially named), represents the last year of the cycle. In the description of the curriculum, language goals are referred to as competencies. There are four competencies students should acquire by the end of their elementary schooling. One of the competencies deals with reading. Specific learning goals are set for each year. As with the Swedish curriculum, Quebec integrates reading into other parts of the curriculum. However, rather than setting goals, the Ministry of Education of Quebec (MELS) requires students to achieve a high level of competency, which in turn requires mastery of various processes and reading purposes. In the questionnaire filled by the National Coordinator of PIRLS, it is said that to help schools ensure that students become competent, a department within MELS is responsible for approving textbooks to be

used in schools, giving teachers a variety of material to choose from. This is in contrast to Sweden, where teachers are completely free in the choosing of their material.

The language section of Quebec's curriculum (MELS, 2001) opens with an explanation of what language is and its purpose. It is stated that language is vital for all forms of education and to be able to communicate as it allows students to be able to structure their thoughts, express themselves with clarity and preciseness and efficiently. Language is essential for creating, analysing, exercising critical judgment, and describing and expressing ideas, perceptions and feelings. It is through the use of language that any perspective of the world can be viewed. It is used to develop an open mind and strengthen and transmit cultural values. The government, through the curriculum, encourages students to gain proficiency in as many languages as possible as students can then develop their personal, social, and cultural identity. Students should be given the opportunity to discover the pleasure, as well as meaning and importance, of the language by developing their reading, listening, writing, and oral skills.

The objective of the school is to "develop the students' capacity for [...] communication so as to enable them to express [their] view of the world, to enter into relationships with other [people], and to acquire and transmit cultural knowledge" (MELS, 2001, p. 70). The language programme has six core outcomes students should achieve by the end of elementary school. They should be able to communicate appropriately in various situations, as well as express themselves clearly in daily situations and acquire the necessary language to do so. Students should be able to critically judge various texts and appreciate a variety of literary works. They should also understand the language system and be able to explain how it works.

The objective of the curriculum is to ensure that the students will be ready for the tasks of life. As the ministry of education stipulates in their document when explaining literacy, students should be able to use the language to get things done and solve problems (MELS, 2001). The language they have should be used to imagine possibilities, develop creativity and share knowledge and experiences with others. More specific to schooling, literacy should be used so that students can learn from the different subject areas of the Quebec education programme.

Rather than dividing language into the four skills (reading, writing, listening, talking) as it has traditionally been done, the curriculum uses the term

“competencies”. There are the cross-curricular competencies that apply to all subject areas and there are the subject-specific competencies. The seven cross-curricular competences are: to use information, to solve problems, to exercise critical judgment, to use his creativity, to use ICT, to develop his personal identity, and to work with others. These competencies are meant to be developed by using all the subject-areas of curriculum. They interact with the subject competencies. They therefore apply to the language curricula. The English Language Art (ELA) is composed of four competencies: to read and listen to literary, popular and information-based texts, to write self-expressive, narrative and information-based texts, to represent his literacy in different media, to use language to communicate and learn. To gain an overview of the Quebec reading system, as is the purpose, focus will be spent on the first ELA competency.

The first competency, to read and listen to literary, popular and information-based texts, is meant to provide students with input to become critical readers (MELS, 2001). Students should be given the opportunity to experience a wide variety of texts in order for students to experience the language, as well as develop strategies to become critical readers.

In order to develop this competency, it is expected that students be provided with an amplitude of texts to be read and situations in which they are read (MELS, 2001). Students should be encouraged not only to read the prescribed reading but also in reading texts of their own choice. They should also be given many opportunities to talk and share their new findings. Students should be encouraged to try various specified reading strategies and try to interpret the text, even if they fail. The teacher is a guide for the student rather than being the only source of knowledge. Through the help of a portfolio, the development of the students’ abilities can be tracked.

Students are required to create a repertoire of their favourite texts, of different genres, and strategies and explain their preferences (MELS, 2001). Being aware of a range of reading strategies and have an understanding of how to use them appropriately is deemed important by the government. Students are required to rely on their background and experiences, as well as discussions with peers and teachers, to respond to texts and evaluate their views (MELS, 2001). The curriculum also states that students should be able to identify the structures and features of various texts. These, along with other aspects, should help them construct meaning. By the end of the first cycle (grade two), students should be able to see themselves as an individual

“self” reader and discuss their progress. The second cycle (grades three and four), are also spent developing their knowledge about various texts and their identity as a reader. They are required to gain an in-depth perspective and seek for clarification through a response process. Always central, the students should continue to add works in their portfolio and be able to explain the reasoning behind them.

When teaching language, there are no prescribed books by the government. However, the curriculum requires teachers to equally represent both male and female authors, characters, and diverse cultural groups and they need to teach a variety of literary, popular, and information-based texts (MELS, 2001). For example, teachers could present narratives, poetry, plays, journals, diaries, and picture books for literary texts. Comics, advertisements, posters, letters, and invitations are examples of popular texts. Teachers could present a variety of non-fiction texts such as science, history, biographies, how-to, visual texts, newspapers, and magazine articles. Students should also be encouraged to choose readings of their own.

The curriculum is specific to as which reading strategies should be taught during language instruction (MELS, 2001). First, they need to use the four main areas of reading decoding systems: semantic, pragmatic, syntax and grapho-phonics. To do so, they are encouraged to activate prior knowledge and personal experiences and relate the text to them. They understand how books work and use graphic representations provided to help interpret the text. Although mainly related to the second competency (writing), they gain knowledge of the common language patterns of the language. They also learn the relationships between the sounds and the written symbols.

Second, students are also expected to develop some self-correcting strategies when reading. The curriculum provides a list of eleven strategies, such as making predictions and inferences, or rereading passages, making connections and adjusting the pace.

Third, by using a trial-and-error approach, or by adjusting the strategies used to the type of text read, students should become efficient in locating information and ideas in texts. Students should also learn how to adjust their strategies to the purpose of the reading, skimming and skipping through unimportant information for example. With help from the teacher, students should be able to make connections between structures and features of familiar texts and their meanings. And just as in the pragmatic strategy of using pictures to help develop understanding, the use of



pictures, tables, and graphs, as well as headings and table of contents should serve students in creating meaning. Several strategies are noted in the curriculum, but are mainly put forth during the third cycle of primary education. For example, all the strategies related to researching a topic are required by the end of grade six only.

The way students should respond to texts is highlighted in the programme (MELS, 2001). Students should read, listen to, and view a panoply of texts of their own choosing. They should develop their own response while interacting with other readers and move beyond their initial response to deepen reflection. Specific classroom applications are written to help teachers help students develop every aspect of the language programme. For example, students are encouraged to search the internet in order to find a range of texts, or to discuss reading responses in pairs, small groups or as a whole class, or to use references from the text to support their views.

As it was mentioned in the introduction to the language programme, the world is seen through language (MELS, 2001). And so, students should be able to understand that texts are social and cultural products. To do so, students are encouraged to compare texts, suggest alternative endings to literary texts, etc. to help them see that the text is a construction. They should also understand the influence of familiar structures and features on the meaning of the text. For example, students may be required to study a text and then reproduce a similar one using the correct features and structures of the given genre. Finally, students should try to identify the views of the world present in a text. This can be done by making inferences and through discussions, for example.

A student who achieves the curricular goals is also required to develop their profile as a reader (MELS, 2001). They should be able to select own texts to satisfy their curiosity and develop their interest. They should also see their own productions as a text with value, and start enlarging their circle of preferred texts to include “young adult fiction” and experience new texts through encouragement of a peer or teacher. Students should also learn how to describe their own taste and preferences through discussions and seeing themselves as part of a reading audience. What are their current favourite texts in comparison with before? Students should be able to enter a dialogue on the subject. They are also expected to describe and explain their reading process by discussing with others reading strategies and the means of reading for them.

Finally, students' reading development should not only be judged by the teacher. Conferences with peers and having an ELA portfolio should help the students realise who they are as a reader and help them continue developing. Though, students need to have a wide range of reflective strategies to be able to self-evaluate themselves efficiently.

## **Theoretical framework**

### **Coleman report**

In 1966, it was demonstrated that a student's background is a high predictor of their achievement score (Coleman, et al., 1966). In a nation-wide analysis, the American sociologist along with colleagues highlighted how a school environment is important in determining achievement scores although the socio-economic status (SES) is the most important. Segregation of schools often leads students with low SES to be over-represented in some schools; leaving them at a disadvantage in their learning development. By having an integrated school system, high achievers were not negatively affected by being integrated in a school with minorities (often lower achievers). Their aspirations and scores did not decrease. However, lower achievers were often driven to achieve and aspire higher when placed with high achievers.

In addition to the individual students' SES, the SES of classmates, the teacher's SES and teaching background were also shown to be important. As Coleman expressed, the skills learnt in school, such as reading, writing, calculating and problem solving, are necessary for the students to climb up the social ladder. If students are failing to reach an acceptable level, in a school system that promotes equal opportunities, educational actors must act to minimise the differences. He also stressed the benefits of integration, an integration that is more than binding the two groups together in the same school.

Integration should be having the two groups interact with one another where the aspirations of the higher achievers give meaning and hope to the lower achievers. Integration should also occur from the very beginning of a pupil's education and not only in later years. Moreover, to have a successful school, students and teachers should be motivated and see their school as a positive place to be. The goal to offer equal opportunities means that schools need to counter the effect of SES on student outcomes. They need to offer help to those students who risk falling behind. What can schools do more than integrating students of all minorities and majority?

### **Teacher effectiveness**

Teachers were also named as responsible, to a lesser extent, for students' achievement scores. Coleman did not only test students' skills but also tested teachers' skills (Coleman, et al., 1966). The results were clear. The quality of the teachers had a greater effect the higher the level of teaching was. Moreover, teachers' score on the verbal skill test also predicted their students' scores. Although most teachers had undergone a teacher training programme, scores varied a lot depending on where the programme had been taken. Therefore, it can be thought that teachers' education matters. It may not be the quantity of education received that matters most, but rather the quality. Hattie (2009) analysed over 800 studies and the results tended towards this direction. However, the effects of teacher general training were small and so was subject matter training. The effects of teacher education in subject were controversial since both significant and insignificant results were found.

Being a teacher does not necessarily imply that the teaching done will be meaningful for the students. Although most of what is done during instruction time is of value, some aspects lead to more effective teachers than others (Hattie, 2009). The quality of teaching occurring and the teacher-student relationships were the most important. Being clear when teaching was also a determining factor. It was then followed by teachers' professional on-going development and their expectations for themselves and students. Hattie urges researchers to discuss the quality of teaching rather than the quality of the teachers. The dynamic model is then useful in evaluating teaching practices.

### **The Dynamic Model of Educational Effectiveness**

Educational effectiveness research (EER) has developed over the past several decades. With the aim of improving the educational system, many aspects of education must be considered. This makes EER a complex field to study. Various models had been proposed in the past but never achieved to fully account for student achievement outcomes.

One of the latest models of education effectiveness is Creemers and Kyriakides' (2008) *Dynamic Model of Educational Effectiveness*. The researchers took into consideration both negative and positive criticisms of previous models in order to create a theoretical model of the components affecting student learning

outcomes. Since we live in a constantly changing environment, it is important for the teaching and learning practices to adapt to reality and be dynamic in form. Being dynamic helps schools become more effective since it provides them with means of improving. For example, a school with bullying issues may concentrate their efforts on the problem for a certain period and then find another problem to continue aiming towards being as effective as possible.

The Dynamic Model of Educational Effectiveness (the Dynamic Model) can be used to analyse all the different actors of educational effectiveness. While this thesis will dedicate its focus to classroom-level factors in educational effectiveness, the Dynamic Model is still an appropriate choice. First, as stated in the previous section, Scheerens' (2013) review of 109 studies using the Dynamic Model concluded that there is still a need for research in the domain of effective instruction. Second, the model is based on the assumption that teacher behaviour in the classroom is strongly associated with student achievement (Panayiotou, et al., 2014; Creemers & Kyriakides, 2013). Therefore, it is valuable to assess classroom factors and gain a better understanding of how they interact with each other and affect reading learning outcomes.

### **The Dynamic Model: a cross-country perspective**

Reynolds (2006) cautions researchers from simply transplanting educational systems from one country to another. Indeed, there are dangers of misinterpreting the systems as there are cultural boundaries that must be taken into consideration. The goal of the study is not to arrive to the conclusion that Quebec's educational system should be implanted in Sweden or vice versa but rather highlight possible differences that may underline why some students are achieving better than others. If it is possible to gain a holistic perspective of the situation and see elements that are functional cross-culturally, it is only advantageous of analysing the situation. Analysing reading achievement from both a Swedish and Quebec perspective is also useful in understanding how policies affect students (Panayiotou, et al., 2014). The authors go on to mention that comparing two countries would contribute to validating the dynamic model as a cross-cultural model.

**The Dynamic Model: a brief explanation**

The Dynamic Model, is a multilevel model which accounts for not only student characteristics and classroom context but also the school context and national policies. Principals, parents, policy-makers, communities, students and teachers all play a role in student's performance both directly and indirectly. The aim of the model is to understand how factors affecting student achievement outcomes work together to enable practitioners to improve their practice, develop strategies and increase outcomes (Creemers & Kyriakides, 2008). The three higher-level factors (i.e. the classroom context, school level, national policy) of the Dynamic Model contributing to student achievement outcomes should be measured using five distinct measurement dimensions when possible (Creemers & Kyriakides, 2008). (However, this study only focuses on the classroom level). This is due to the researchers' belief that the factors are multidimensional. The frequency of an action (factor) may indicate part of the reason for achievement but there is still large amount of variation that needs to be taken accounted for. This is why the model proposes to measure the effectiveness of the factors using frequency and four other measurement dimensions. By doing so, the factors can be better understood, yet the model remains parsimonious. The focus of the activity, as well as when the activity was performed (the stage), the quality of the activity and how differentiation is approached for different groups of people are also vital in understanding how the factors act upon student achievement. Frequency measures the factor quantitatively whereas the other four dimensions (focus, stage, quality and differentiation) measure it qualitatively and help understand the complexity of the factors. However, it should be noticed that there must still be variation in the way the factors are measured.

Indeed, factors from the two highest hierarchical levels are not measured exactly as the classroom-factors since they must be measured over time (Creemers & Kyriakides, 2008). By this, Creemers and Kyriakides mean that the factors' effect of the school and national levels are specific to their contexts; with regards to both place and time. For example, if a school changes a policy about absenteeism when it is not a problem, then the change will not give any effective results. The achievement outcomes would not significantly alter if the teachers and students are rarely absent from that particular school. However, the same policy change in another school could make a drastic positive change if absenteeism is an issue.

Since the present study focuses on factors belonging to the classroom model and school learning environment (SLE), a greater importance will be given in explaining how the dynamic model is constructed with regards to the classroom level in the following section and briefly discuss one of the aspects of the school level, SLE.

### **The Dynamic Model in relation to current research Student level.**

In the Dynamic model, students are at the first level. The greatest factors determining their academic success are related to them directly. Students' socio-economic statuses are vital in the model. For decades, researchers have understood the importance of SES and have been trying to increase knowledge surrounding its components (Coleman, et al., 1966; Gustafsson, Hansen, & Rosèn, 2013; Kyriakides & Creemers, 2009; Sirin, 2005; Yang & Gustafsson, 2004). When analysing SES, there seems to be two main components: the cultural heritage students enter the educational world with and the economic status of the student.

### **Teacher/Class level.**

At the classroom level of the Dynamic Model, the teacher is at the centre. It is the teacher that is responsible for ensuring student academic success. They should prioritise students by ensuring their progress through monitoring. As the orientation factor of the Dynamic Model demonstrates, teachers should guide students and ensure they are goal orientated.

If students are to learn how to set personal goals for their learning, they should be aware of the general objectives of the courses and tasks required of them. An effective teacher will ensure that the students know the aims of task and explain the importance of the new skill or strategy that is being practiced (Rupley, Blair, & Nichols, 2009). Not only will the presentation of the objectives (the orientation task) help students negotiate their individual goals, but it will also serve as modelling. Students will become more aware as to how one can regulate their own learning. Moreover, having orientation tasks creates meaning for the student. Participation can thus be increased if students understand why the lesson is needed (Creemers &

Kyriakides, *The dynamics of educational effectiveness: A contribution to policy, practice and theory in contemporary schools*, 2008).

Students will also benefit from a structured environment. Of course, different activities require different levels of structure, but effective teachers understand it and adapt appropriately. As Rupley, Blair and Nichols (2009) state, teaching reading skills requires a teacher to be highly in control of the learning situation whereas teaching a cognitive strategy leaves more space for students to experiment with the new knowledge being acquired. Nevertheless, the effective teacher needs to be in control of the situation by directing students in their learning. The teacher should call on prior knowledge and sustain students' interests while facilitating students' progress from a simple task to more complex ones as time unfolds. By being in an appropriately structured environment, students learn to self-regulate themselves. From their teacher's organisational skills, students will learn to plan and set appropriate goals. The teacher then becomes an aid or monitor in the students' learning.

By structuring the lesson appropriately, an effective teacher is able to provide students with meaningful exercises which are adapted for their level. Vygotsky's theory of zone of proximal development (ZPD) supports the reasoning behind the differentiation teachers are called upon to do in their teaching (Vygotsky, 1978). In order for students to succeed, tasks adapted to their level are required. It is important for teachers to try to support each individual either by supplementing the core content with harder activities or by giving extra practice to those who need it. Differentiation can also be achieved if the teacher uses various methods and strategies to explain the content to the students. Riley summarized the importance of structure and differentiation when explaining how a learning environment for reading should be. She wrote "they [the readers] experience a balanced structured programme that enables and monitors progression at each individual's level... [and] offers structured support and teaching at the whole/small-group and individual levels" (Riley, 1996, p. 75). With regards to students becoming self-regulated, differentiation helps them develop their ability to set realistic goals for themselves.

Students should also have the opportunity to differentiated activities when needed. As Reis, McCoach, Little, Muller and Kaniskan (2011) discussed in their findings, differentiation is beneficial for every student. Higher achievement students may not have improved drastically but their scores were not worsen either. In contrast, lower achievers were greatly helped by having access to a differentiated teaching

approach. In this study, students were encouraged to read independently and had individual short meetings with the teacher regularly to discuss the readings.

In order for differentiation to take place appropriately, teachers should gain a holistic overview of the students' needs. Formative and summative assessments can be used to collect information and then make a founded decision. When gathering information on the students' learning using formative assessment, not only can teachers better adjust, but students as well (Meusen-Beekman, Joosten-ten Brinke, & Boshuizen, 2015; Nicol & Macfarlane-Dick, 2006; Riley, 1996). With the results from those assessments and feedback, students can learn to self-regulate their learning and understand how their efforts are rewarding and adjust consequently.

Young students have not reached cognitive maturity and must then be supported in their learning. As both countries' curriculum present, students should learn life-long skills and for that, they must learn how to be self-regulated. It is with the help of teachers that students may learn how to monitor themselves. Along with explanations and questioning, modelling allows students to visualise the strategies and skills that are to be learnt.

Explicit teaching of reading is a necessary instruction method for students to become good readers (Rupley, Blair, & Nichols, 2009). In opposition to other skills, maturation does not help students learn the reading processes. They need a mentor/teacher to help them acquire the knowledge and strategies to help them learn how to read. Through presentation of reading activities, feedback and guidance, students slowly improve their reading abilities. The authors further state the importance of communication in order to maximize the reading lessons. As they mention, "[t]he key to direct/explicit instruction is active communication and interaction between teacher and student (Rupley, Blair, & Nichols, 2009, p. 127)." The Dynamic Model includes such aspect in the classroom factor *Teacher's Contribution in Making a Learning Environment*. Explicit instruction requires the teacher to not only explain but model and guide the students in their development. Guidance, for example, can take the form of various questions where students are required to expand their thinking. And as Vygotsky's ZPD stipulates, teachers should act as monitors for students and help them progress in their learning by guiding them. As previously mentioned, this guidance that teachers can provide offers students an opportunity to learn how to be self-regulated.



A teacher's role is, as mentioned throughout this section, to support the student. One way of supporting students in their quest to academic success is to provide them with meaningful moment for them to acquire the knowledge that is transmitted. Students should be encouraged and be given time to practice reading and reinvest their knowledge (Riley, 1996). Through allotted time, students can develop their skills and strategies to gain fluency in reading. A positive learning environment created by the guidance of the teacher should be available for them to challenge themselves and progress in their learning (Cosmovici, Idsoe, Bru, & Munthe, 2009). In the study, students' learning environment was significantly linked to their reading achievement and time spent on-task.

### **School learning environment (SLE).**

A good learning environment is an important predictor of a school's effectiveness. Therefore, schools should maximise their efforts in creating a positive learning environment (Cosmovici, Idsoe, Bru, & Munthe, 2009). As the authors expressed in the discussion, a positive SLE may not be the most determinative for high achievers but it is important for low achievers who may not always have the necessary support from home. Since a good SLE is not negative for any group of students, it should then be a goal to achieve a good SLE. Academic optimism is a key to understanding and developing SLE as it leads every member of the school community to believe in their capacities to make a difference (Hoy, Tarter, & Hoy, 2006). School emphasis on academic success (SEAS) is a construct based on the academic optimism (Martin, Foy, Mullis, & O'Dwyer, 2013). SLE comprises five aspects: student behaviour outside the classroom, teacher interaction and collaboration amongst themselves, partnership policies (referring to relationships between the school and its surrounding agents such as parents and community), access to learning resources for both teachers and students, and values encouraging learning.

To measure the effectiveness of this factor, one must examine if all the five aspects of SLE are covered by the school policies. If the school attempts to create a safe learning environment outside of the classroom, facilitates teacher collaboration, promotes positive relationships between different actors, provides useful educational resources and if there is an attempt to develop positive attitudes towards learning are elements that should be covered by the policies. The SLE policies should also be specific and serve as guidelines for its users. Strategies to help SLE should also be

referred to. The policies and actions about creating a SLE should also be measured based on their qualities. The policies should be reliable, valid, and based on prior literature. The actions taken by the school should be to a high extent influenced by the SLE policies. Finally, the policies should be flexible, adapt policies based on the evaluations done, and students or teachers risking to disturb a positive SLE should be given extra support.

Since the Dynamic Model measures these five aspects, using the SEAS construct is appropriate in the study as it evaluates the interaction and collaboration between all the levels of the model. Recently, Nilsen and Gustafsson (2014) studied Norway's SEAS and concluded that it had positive effects on students' academic results. SEAS is based on teacher's understanding of school's curricular goals, their success at implementing the goals, their expectation of student achievement, parental support for achievement of student, parental involvement in school activities, students' views on school property and their desire to do well in school. It promotes a positive SLE.

## **Research questions**

This thesis seeks to answer the following questions pertaining to reading achievement in the two territories under consideration.

- 1) How do Sweden and Quebec present reading in the prescribed curriculum?
- 2) What teacher-related factors are the most important for the learning of reading?
- 3) What teacher-related and classroom factors are positive for students' learning process in Quebec?
- 4) What teacher-related and classroom factors are the most beneficial for the students from Sweden?

## **Methodology**

### **Rational for using Structural Equation Modelling (SEM)**

Since prior studies, as discussed earlier, have shown that the selected factors are valuable for students' learning, using SEM is relevant. By using this statistical approach, understanding how valuable certain teaching practices are will be possible.

The path model will enable the researcher to study the mechanisms among the constructs (Brown, 2006). Not all factors have linear effects on reading achievement, however, it does not imply that the factors in questions are not worthy to be analysed further (Creemers & Kyriakides, 2008). The factors should be able to interact with one another in order to gain a better understanding about their relationships. Analysing the path models will lead to answering the second research question. The last two research questions will in turn be answered due to the use of SEM and analysing the parameters of the two groups separately.

The model has latent variables. In order to measure the true values of the variables, it is important for them to be error free. SEM provides the opportunity for the latent variables to separate measurement error from true variance (Brown, 2006). Measuring variables without any error is very rarely possible in social sciences due to the nature of how the data is collected. If measurement error is not taken into consideration, Brown argues that the results may be attenuated.

Moreover, the two-level model used allows the possibility to decompose the total variance into the individual-level (student) and class-level (teacher) variation (Brown, 2006). This opportunity allows the researcher to understand the true variance better than if the two levels could not be decomposed. One element of the Dynamic Model is that the variables interact with one another not only at the same level, but also at different levels (Creemers & Kyriakides, 2008). Having a statistical method that is able to decompose the total variance makes it an adequate choice for analysing the data as it gives the possibility to explain the relationships between all factors and explain the appropriate part of the variance.

### **Programmes**

The statistical programme SPSS version 22 was first used for data management. The variables were recoded when needed, a few variables were summed and renamed to facilitate the use of the variables for the researcher. Afterwards, MPLUS 7 (Muthén & Muthén, 1998-2015) was used to do the modelling due to its ability to do two-level modelling.

### **Dataset**

The PIRLS 2011 data is the third assessment of the five-year recurring exam measuring reading achievement trends for 4<sup>th</sup> graders (Mullis I. , Martin, Kennedy, Trong, & Sainsbury, PIRLS 2011 assessment framework, 2009). As the organisers of PIRLS specified, participants having four years of education was aimed by the IEA

since it is believed that students are no longer learning to read but rather reading to learn. This international data set is complete in that it offers its users not only the results of the tests but also information about the users and their background, language teachers, schools and national curricula. This information, in perspective to the Dynamic Model (Creemers & Kyriakides, 2008), gives more possibilities for researchers to understand how each actor interacts with students' reading outcome and compare various education systems.

Although data is available for 45 countries, only Sweden and Quebec's data is used. The participants were randomly selected using a two-stage cluster sample design (Martin & Mullis, 2012). First, the schools to participate were chosen. The odds of a school being chosen were proportional to their sizes. Two reserve schools were also systematically chosen in the event the original school would choose not to participate. Second, the fourth grade classes were chosen to participate. Case weights are used in this two-level modelling to account for the cluster sample design nature of this study (Joncas & Foy; Yang Hansen, Rosén, & Gustafsson, 2011). The goal of the international assessments is to understand trends of the various participating populations. Since it is not random individuals that are being selected to participate, but classes, weights are necessary to be able to make the results generalizable at the country level.

In this study, there are 4524 students that represent Swedish population and 4244 students from the Quebec population. A total of 8768 individuals is included in the current study. These students were clustered in different classrooms, which are used as second-level unit of analysis. There are 251 and 220 classrooms in Sweden and Quebec respectively. Approximately 18 students were in each Swedish class while Quebec had 19 students on average. The data is presented in Table 1. The large sample size in PIRLS 2011 for both countries is an advantage for providing foundation for the stability of the parameter estimates and offering more power to generalise the findings afterwards (Pohlmann, 2004).

Table 1. Number of students and classes involved in PIRLS 2011 in Quebec and Sweden.

Country	Students	Classrooms	Average number of students per class
Quebec	4244	220	19
Sweden	4524	251	18
Total	8768	471	-

## Variables

The initial examination of the data set identified the following variables for inclusion in the analysis.

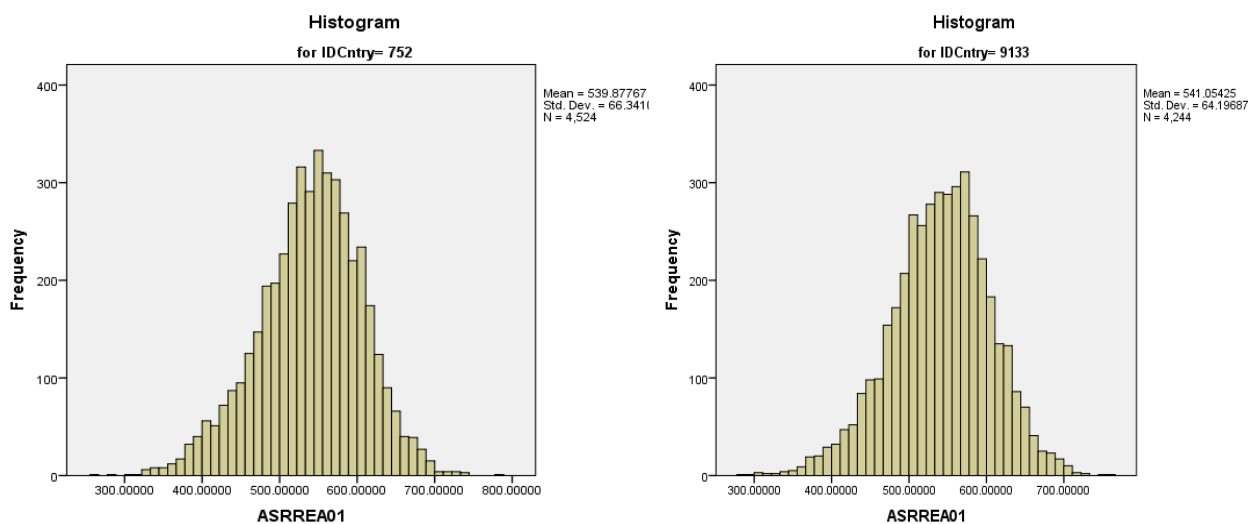
### *Dependent variable*

#### **Reading achievement (ASRREA01).**

When looking at the histogram of the reading achievement variable (Fig. 1), it can be thought that this outcome variable is normally distributed but the zSkew (-7.73 for Sweden and -5.5 for Quebec) and zKurtosis (Sweden: 3.76, Quebec: 3.52) reveals the presence of outliers. Though, due to the statistical methods used, it was decided not to eliminate them. Boneau (1960) was among the first to test the robustness of ANOVA t-tests. The findings showed that outliers did not significantly modify the test results. Recently, Schmider et Al. (2010) also verified the robustness of ANOVA and concluded that data are not required to be perfectly distributed to provide significant results, thus a few outliers is acceptable.

The main dependant variable of this model is the student's reading score on the PIRLS test. In Sweden, the mean was 545.453 (standard deviation: 64.665), while in Quebec it was slightly lower with a mean score of 543.620 (standard deviation:

Fig. 1 Histogram of the data distribution based on the reading achievement scores



\*IDCntry 752 is Sweden and 9133 is Quebec.

63.044). The results for students' reading scores are presented in table 2.

Table 2. Descriptive statistics for reading achievement in both jurisdictions

Variable	Scale	Country	mean	Standard deviation	Z-skew	Z-kurtosis
Reading achievement ASRREA01	Continuous variable	Quebec	543.620	63.044	-5.5	3.52
		Sweden	545.453	64.665	-7.73	3.76

### **SEAS.**

In order to add SEAS to the model, it was decided to use the variables ATBG06A ATBG06B ATBG06C ATBG06D ATBG06E ATBG06F ATBG06G ATBG06H from the dataset. The questions asked to the teachers pertained to their job satisfaction, understanding of the school's curricular goals and how successful they are at implementing them, as well as their expectation of student's achievement (questions A-D). The last four variables (E-H) regards parental support and involvement in school activities as well as students views on school property as well as their desire to do well in school. These variables, reflect how the school emphasises students' academic success (Mullis I. V., Martin, Foy, & Drucker, 2012). They were negatively worded statements, therefore they were recoded as to assign higher values to more positive answers. One was therefore used to represent very low agreement with the statement and five as being very high. The eight variables were summed together using the standardised values and defined as the factor SEAS. As presented in table 3, the results are as follows: SEAS' mean for Sweden was -0.219 (standard deviation 4.513) and 0.583 (standard deviation 4.477) for Quebec.

### **TeaQua.**

Secondly, teacher's education related to teaching reading and special education was also included. At an international level, teachers with reading education had students with higher average scores (Mullis I. V., Martin, Foy, & Drucker, 2012). Three summed variables were used to define the latent factor TeaQua. Their means were used. The variables were scaled from one to three where one indicated that there was no emphasis on the variable during their education and three meant it was an area of emphasis. The first one, "LangEd", was composed by using the variables ATBR20A and ATBR20H which refers to the extent to which the teacher studied the language of the test and reading assessment. ATBR20A has a mean score of 2.76 (std.

0.666) for Sweden and 2.61 (std. 0.750) for Quebec. The mean for ATBR20H was 1.79 (0.690) and 2.06 (0.594) for Sweden and Quebec respectively. The second one, “ReadEd”, was composed using the variables ATBR20B and ATBR20E. These two variables refer to the extent the teacher studied reading pedagogy and theory. ATBR20B has a mean of 2.48 (0.666) and 2.36 (0.544) for Sweden and Quebec. A mean of 2.26 (0.696) and 2.03 (0.602) is calculated for ATBR20E. Finally, the third summed variable, “SpecREd” refers to how much the teacher studied special education pedagogy. The variables ATBR20D and ATBR20F were used and refer to remedial reading studies and special education studies respectively. According to the answers given by the teachers, Sweden had a mean of 1.78 (0.634) for education in remedial reading and 1.89 (0.745) for special education studies, while Quebec has a mean of 1.81 (0.580) for remedial reading and 1.61 (0.702) for special education. The results are presented in table 3.

#### **WhatRead.**

The factor WhatRead was derived from three summed indicators. The first one deals with the type and sources of reading resources used in class while the second and third indicators deal with the type of texts used for reading instruction: literary versus informational texts. The results for the descriptive statistics are shown in table 3.

*Type.* The first one was with regards to the type of reading resources used in class (type). The variables ATBR06A to ATBR06H were used. The answers were on a scale of one to three and were recoded to give positive answers a higher value. The three possible answers were “not used”, “supplement”, and “basis for instruction”. The values in parenthesis are the means (standard deviation) for both Sweden and Quebec respectively. How much textbooks (2.41 (0.588), 2.37 (0.708)), reading series (2.30(0.656), 1.91(0.643)), workbooks and worksheets (2.24(0.541), 2.47(0.555)), children’s books (2.57(0.505), 2.46(0.513)), material from various curricular areas (2.24(0.502), 2.18(0.514)), children’s newspapers and magazines (1.93(0.504), 1.78(0.562)), computer software for reading instruction (1.68(0.575), 1.40(0.556)), and reference materials (2.16(0.474), 2.29(0.493)) are used during reading activities were the variables used for “type”.

*LitMater.* The answers are scaled from one to four where one stands for never or almost never and four stands for always (every day or almost every day). Two and

three represents that the texts are used once or twice a month and once or twice a week respectively. The variables were positively recoded. The second indicator “LitMater” is a sum of ATBR07AA to ATBR07AD. These variables are concerned with the used of literary materials for reading instruction. The means and standard deviations are first given for Sweden and then Quebec in parentheses. Teachers were asked to answer how common it is for students to work with short stories (2.73 (0.732), 3.13 (0.670)), fiction books with chapters (3.67 (0.496), 2.72 (.988)), plays (1.30 (0.546), 1.36 (0.629)), and other literary material (2.15 (0.911), 2.13 (0.960)).

*InfMater.* “InfMater” is a summed variable taken from the variables ATBR07BA to ATBR07BC. Teachers responded to how often they use subject area books and textbooks, longer non-fiction books with chapters, and non-fiction articles. The scale was the same as for LitMater and were also recoded. The use of textbooks or subject area books was high in Sweden compared to Quebec with a mean of 3.50 (0.614), and 2.76 (0.784) respectively. The mean response for the use of non-fiction chapter books was 2.25 (0.944) in Sweden and 2.09 (0.835) in Quebec. Finally, the use of articles was 2.45 (0.724) for Swedish teachers and 2.40 (0.745) in Quebec.

### **HowReIns.**

The way reading instruction is delivered to the children is also included in the model. “HowReIns” is the latent factor that represents how reading instruction is done during the activities, the strategies taught and the activities done after the reading activities. All three latent variables are summed from scalar variables. As the variables from LitMater and InfMater, During is scaled from one to four. The answers were recoded to assign higher values to more positive answers. The descriptive statistics for each variable involved are presented in table 3.

*During.* “During” was the first latent variable summed from the variables ATBR08A to ATBR08G. It involved how teachers presented or performed reading activities in the classroom. The means for Quebec and Sweden were very similar in most parts but differed mainly with regards to teaching strategies for decoding sounds. It is first the Swedish results that are presented followed by Quebec. ATBR08A deals with the teacher reading aloud to the class. The means were 3.58 (0.571) and 3.44 (0.665). ATBR08B is students being asked to read aloud (3.06 (0.676) and 3.43 (0.604)). ATBR08C is students read silently. Sweden had a mean of 3.75 (0.444) and Quebec had 3.84 (0.394). ATBR08D is students reading a book of their own



choosing. This variable was almost identical for both countries with means of 3.72(0.473) and 3.75 (0.509). ATBR08E is the teacher taking time to teach reading strategies related to decoding sounds and words. In Sweden, the mean was 1.91 (0.984). While it was 2.69 (0.986) in Quebec. ATBR08F is teaching vocabulary systematically to students. The mean was 2.75 (0.671) and 3.11 (0.696) for Sweden and Quebec respectively. ATBR08G is teaching and modelling skimming and scanning strategies. Both countries had similar responses for this variable as well (2.03 (0.735), and 2.01 (0.956)).

*Strategy.* The “strategy” variable is the sum of the variables ATBR09A to ATBR09I. All the variables deal with the teaching of strategies to help students with their reading abilities. The results are given for Sweden and Quebec in parenthesis. ATBR09A variable is to locate information in the text (3.39 (0.597), 3.36 (0.584)). Teaching strategies to identify main ideas in the text is ATBR09B (2.96 (0.722), 3.17 (0.607)). ATBR09C is related to the teaching of strategies of explaining and supporting their understanding of what they have read (2.93 (0.721) and 3.25 (0.625)). Strategies to compare reading with their life experiences is variable ATBR09D (2.64 (0.769), 2.69 (0.799)). ATBR09E is strategies of comparing reading with other readings (2.12 (0.749), 2.49 (0.788)). To make predictions about text strategies is represented by variable ATBR09F (2.41 (0.873), 2.92 (0.744)). ATBR09G is the variable for the teaching of how to make generalisations and inferences based on their reading (2.58 (0.761), 2.95 (0.734)). Finally, the last two strategies included in the questionnaire were ATBR09H (1.98 (0.749), 2.42 (0.845)) and ATBR09I (1.77 (0.697), 2.46 (0.887)) which deal with describing the style or structure of the read text and determining the author’s perspective or intention.

*After.* Finally, the variables ATBR10A to ATBR10D were summed to create the variable “after”. They refer to the tasks students were required to perform after a reading experience. According to the teachers’ responses, were students required to write about or respond to what they had read (ATBR10A), answer questions or summarise orally (ATBR10B), talk with each other about what they read (ATBR10C) or did they take quizzes or test about what they had read (ATBR10D)? For Sweden, the mean results were as following for all variables in order A-D: 2.79 (0.705), 3.00 (0.691), 2.60 (0.816), and 1.90 (0.798). The mean for Quebec was 2.38 (0.741), 3.11 (0.760), 2.36 (0.877), and 2.50 (0.759) for the variables ATBR10A-ATBR10D.

### **TimeRead and TimAcros.**

The IEA dataset already provides some composed variables. The derived variable named ATDRREHW was used to represent the number of hours spent on reading per week across the curriculum. It was renamed “TimAcros” for this study. “TimeRead”, also based on derived variables provided by IEA, is a summed variable. The derived variables ATDRLAHW and ATDRRLHW were used and were renamed TimeLang and LangInst. They both measured the amount of time spent on language instruction. All three variables are continuous variables that measures the amount of time spent in class on reading. TimAcros, a variable measuring reading throughout the whole curriculum and not just during reading instruction, had a mean of 3.97 (2.821) for Sweden and 3.44 (1.351) for Quebec. TimeLang had a mean of 2.08 (1.148) and 2.62 (1.029) for Sweden and Quebec respectively. Sweden’s mean was 5.99 (2.501) and Quebec’s mean was 7.98 (2.301) for LangInst. The results are presented in table 3.

### *Independent variables*

#### **SES.**

The socio-economic status was considered important for this study. Past studies (Gustafsson, Hansen, & Rosèn, 2013; Myrberg & Rosèn, Direct and indirect effects of parent's education on reading achievement among third graders in Sweden, 2009; Sirin, 2005; Yang & Gustafsson, 2004) have shown that students’ background has an effect on students’ achievement outcomes. School’s social class (each student’s SES) or level of effectiveness is in part responsible for students’ learning outcomes (Reynolds, 2006). The cultural assets to which students have access is one part of the SES that needs to be considered. In the realms of this study, the cultural aspects will be the main part assessed by the model. It is the parent’s highest level of education, as well as the amount of books students have access to that will act as representatives of SES. The descriptive statistics for the SES variables are presented in table 3. This variable is used in the study to control the students’ backgrounds since it is a main indicator of reading achievement.

Table 3. Descriptive statistics for variables used

Latent variable/ Index	Indicators	Variable name and description	Scale	Sweden		Quebec	
				Mean	SD	Mean	SD
SEAS	-	Summed variable from ATBG06A-H	scalar	-0.2	4.51	0.58	4.48
TeachYrs	-	ATBG01, years of teaching experience	continuous	14.3	10.7	15	8.95
TeaQua	LangEd	ATBR20A (language of the test)	Scalar 1-3 (1:no emphasis, 3: area of emphasis)	2.76	0.67	2.61	0.75
		ATBR20H (reading assessment)	Scalar**	1.79	0.69	2.06	0.59
	ReadEd	ATBR20B (reading pedagogy)	Scalar**	2.48	0.67	2.36	0.54
		ATBR20E (reading theory)	Scalar**	2.26	0.7	2.03	0.6
	SpecREd	ATBR20D (remedial reading)	Scalar**	1.78	0.63	1.89	0.75
		ATBR20F (special education)	Scalar**	1.81	0.58	1.61	0.7
WhatRead	Type	ATBR06A (use of textbooks)	Scalar 1-3 (1: not used, 3: basis for instruction)	2.41	0.59	2.37	0.71
		ATBR06B (use of reading series)	Scalar**	2.3	0.66	1.91	0.64
		ATBR06C (use of workbooks and worksheets)	Scalar**	2.24	0.54	2.47	0.56
		ATBR06D (use of children's books)	Scalar**	2.57	0.51	2.46	0.51
		ATBR06E (use of material from other curricular areas)	Scalar**	2.24	0.5	2.18	0.51
		ATBR06F (use of children's newspapers and magazines)	Scalar**	1.93	0.5	1.78	0.56
		ATBR06G (use of reading computer software)	Scalar**	1.68	0.58	1.4	0.56
		ATBR06H (use of reference material)	Scalar**	2.16	0.47	2.29	0.49

	LitMater	ATBR07AA (use of short stories)	Scalar 1 to 4 (one is never or almost never and four is every day or almost every day)	2.73	0.73	3.13	0.67	
		ATBR07AB (use of fiction books with chapters)	Scalar***	3.67	0.5	2.72	0.99	
		ATBR07AC (use of plays)	Scalar***	1.3	0.55	1.36	0.63	
		ATBR07AD (use of other literary material)	Scalar***	2.15	0.91	2.13	0.96	
	InfMater	ATBR07BA (use of textbooks or subject area books)	Scalar***	3.5	0.61	2.76	0.78	
		ATBR07BB (use of non-fiction chapter books)	Scalar***	2.25	0.94	2.09	0.84	
		ATBR07BC (use of articles)	Scalar***	2.45	0.72	2.4	0.75	
	HowReInst	During	ATBR08A (teacher reading aloud)	Scalar***	3.58	0.57	3.44	0.67
			ATBR08B (students reading aloud)	Scalar***	3.06	0.68	3.43	0.6
			ATBR08C (students reading assigned book silently)	Scalar***	3.75	0.51	3.84	0.39
ATBR08D (students reading own book)			Scalar***	3.72	0.47	3.75	0.51	
ATBR08E (teaching strategies decoding)			Scalar***	1.91	0.98	2.69	0.99	
ATBR08F (teaching vocabulary systematically)			Scalar***	2.75	0.67	3.11	0.7	
ATBR08G (teaching skimming and scanning)			Scalar***	2.03	0.74	2.01	0.96	
Strategy		ATBR09A (locate information within text)	Scalar***	3.39	0.6	3.36	0.58	
		ATBR09B (identify main ideas)	Scalar***	2.96	0.72	3.17	0.61	
		ATBR09C (explain or support understanding of what they have read)	Scalar***	2.93	0.72	3.25	0.63	
		ATBR09D (compare reading with experiences)	Scalar***	2.64	0.77	2.69	0.8	
		ATBR09E (compare reading with other readings)	Scalar***	2.12	0.75	2.49	0.79	
		ATBR09F (make predictions about text)	Scalar***	2.41	0.87	2.92	0.74	

		ATBR09G (make generalisations and inferences based on reading)	Scalar***	2.58	0.76	2.95	0.73
		ATBR09H (describe the style or structure of the text)	Scalar***	1.98	0.75	2.42	0.85
		ATBR09I (determining perspective or intention)	Scalar***	1.77	0.7	2.46	0.89
	After	ATBR10A (write about or response to reading)	Scalar***	2.79	0.71	2.38	0.74
		ATBR10B (Orally answer questions or summarise)	Scalar***	3	0.69	3.11	0.76
		ATBR10C (talk with each other about reading)	Scalar***	2.6	0.82	2.36	0.88
		ATBR10D (take quiz or test about reading)	Scalar***	1.9	0.8	2.5	0.76
TimAcros		ATDRREHW (time spent on reading throughout the curriculum)	Continuous	3.97	2.82	3.44	1.35
TimeRead	TimeLang	ATDRLAHW (time spent on language instruction)	Continuous	2.08	1.15	2.62	1.03
	LangInst	ATDRRLHW (time spent on language instruction)	Continuous	5.99	2.5	7.98	2.3
SES	Pedu	ASDHEDUP (parents' highest education)	5-scale (1= some primary education or less, to 5= university degree or higher)	4.05	1	4.29	0.81
	POccp	ASDHOCCP (parents' highest occupation)	6-scale (1= no work outside home, to 6=professional)	5.81	0.02	5.20	0.02
	Books	ASBG04 (number of books at home as described by student)	5-scale (1= < 10 books, to 5= > 200 books)	3.71	1.23	3.25	1.22

\*The same scale as ATBR20A

\*\*The scale is the same as ATBR06A

\*\*\* The scale is the same as ATBR07AA

*PEduc.* The parental education level (PEdu) is a variable indicating the highest level of education of one of the parents. It is a derived variable, originally named ASDHEDUP, from the father's and the mother's level of education. It was recoded for the use of the model as it was negatively formulated in the original questionnaire. It is a scalar variable between one and five. One refers to a household where the highest level of education is "some primary education or less" and five is where at least one of the parents has a "university degree or higher".

The parent's education mean for Sweden was 4.05 with a standard deviation of 1.00. There were 3072 (67.9%) cases included. Quebec had 3326 (82%) included cases and a mean of 4.29 with a standard deviation of 0.814.

*Books.* The scalar variable "Books" (originally ASBG04) refers to the number of books available at home as described by the student. There were five possible values and they were recoded as they were negatively formulated. One refers to having less than ten books at home while five refers to having more than 200. In Sweden, 72.5% of the cases were valid (3282 responses) and 82.4% (3498 responses) in Quebec. The mean for Sweden was 3.71 and 3.25 for Quebec (standard deviation: 1.230 and 1.220).

*POccp:* ASDHOCCP was renamed POccp for the purpose of the study and referred to the parents' highest level of education. The variable was constructed based on the responses to the home questionnaire about the mother and father's occupation. It is a scalar variable that was recoded so the statements would be positively formulated according to the given values. One refers to "never employed outside the home" and six is "professional". Both jurisdictions had a high level of valid responses with approximately 81%. In Sweden, the mean is 5.81 (0.019) and it is 5.200 (0.019).

Table 4 shows the intra-class correlations. The correlations for the SES indicators were relatively high in Sweden, but less in Quebec. ASRREA01 had a correlation of 0.194 in Sweden and 0.149 in Quebec. The correlation for Books in Sweden was more than double the one in Quebec with a correlation of 0.211 compared to 0.096. Parent's education intra-class correlation was similar for both jurisdictions with 0.162 and 0.170 for Sweden and Quebec respectively. Parent's occupation correlation was 0.163 in Sweden and 0.098 in Quebec.

Table 4. Intra-class correlations for SES and ASRREA01

Variable	Sweden	Quebec
ASRREA01	0.194	0.149
Books	0.211	0.096
PEduc	0.162	0.170
POccp	0.163	0.098

### **TeachYrs.**

Individual components of the teachers were also included in the model. First, the number of years a teacher had in teaching experience (originally named ATBG01 in the dataset) was included as an indicator for teaching experience since it is thought that experience gain through teaching may influence their approach to the teaching of reading. The researcher believe that teachers with more experience would understand better how to evaluate students' need based on past experiences. The general results of PIRLS 2011 published showed that the highest average for reading achievement had teachers with over 20 years of experience whereas teachers with less than five years of experience was linked to the 12% with a lower average (Mullis I. V., Martin, Foy, & Drucker, 2012).

In Sweden, teachers had been teaching, on average, 14.28 years at the moment of the test (standard deviation 10.67). Quebec's teachers had been teaching for 15.04 years on average (standard deviation 8.95). The results are presented in table 3.

### *Identification variables*

Since two distinct populations were analysed, there was a problem with the student and class identifications because both countries had similar class numbers. To solve the issue, unique identification numbers were distributed to each student and class by transforming the two variables using these two formulas:

For Sweden:  $7 * 100000000 + \text{IDSTUD}$  (alternatively  $\text{IDCLASS}$ )

For Quebec:  $9 * 100000000 + \text{IDSTUD}$  (alternatively  $\text{IDCLASS}$ )

The new variables were named IDstudC and IDclassC.

Finally, a variable was needed to separate the two countries, as well as another one to weight the data. House weight, HOUWGT, was used to compensate for the clustered nature of the data used, as discussed previously. IDCNTY was used as the country variable. Quebec is 9133 and Sweden is referred to as 752.

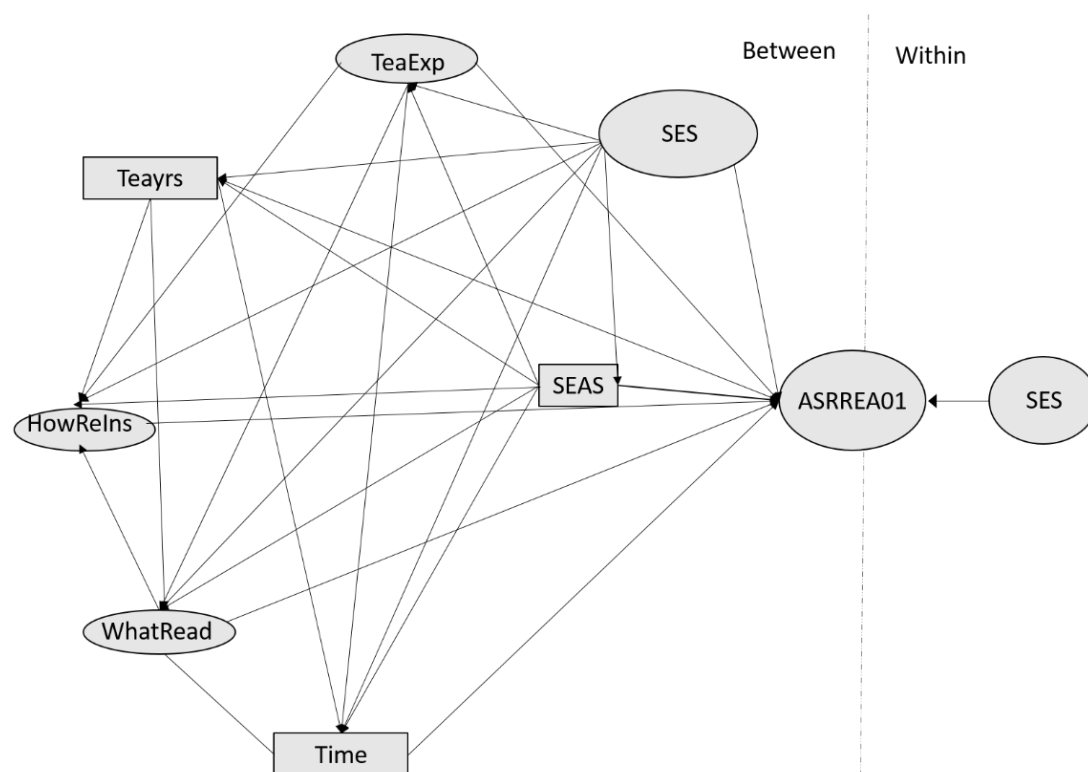
## Model

The model is a two-level model. The students' SES is at the first level (within) and then teacher factors are at the second level (between). The students were grouped within classes and both countries were kept separate. Figure 2 is a representation of the model that was tested.

At the first level, the SES factors were correlated with each other and they were regressed onto the reading achievement score. At the other level, SES was also treated the same. Moreover, the SEAS, TeaExp, Teachyrs, TimeRead, TimACros, WhatRead, HowReInst variables were regressed on the reading achievement score (ASRREA01).

Other regressions were taken into consideration in the model. A regression of SEAS was performed on TimeRead, TimACros, WhatRead, HowReInst, TeaExp, Teachyrs. SES was also regressed on the same variables, as well as on SEAS. Teacher's experience and the number of years they had been teaching were correlated together and were used in a regression on TimeRead, TimACros, WhatRead, and HowReInst. The time spent on reading altogether was regressed on the sources of reading used. Finally, the latter was regressed on HowReIns. TimeRead and TimACros were correlated.

Fig. 2 Representation of the model tested





### **Reliability and validity**

The model was initially based upon past studies. However, before modelling, a thorough examination of the questionnaires and the variables available was made and the greater number of items possible was included into each new computed variable as to increase the internal consistency reliability. Calculating the Cronbach's coefficient alpha is a tool to show how reliable the variables are (Bryman & Cramer, 2011). The general rule is that the reliability coefficients should be above 0.70. As it will be described below, some of the values were below 0.70. However, as discussed earlier in the rationale for using SEM, measurement errors are accounted for in the model and therefore values below the Cronbach's alpha 0.70 does not necessarily imply a low reliability (Brown, 2006).

The correlation between the items is used to ensure that there is a significant interdependence among the items thus increasing the construct validity. According to the results obtained at an early stage (looking at the correlation table- table 5), the path analysis was revised and any insignificant variables ( $p < 0.05$ ) for both countries were removed from the model to simplify it as much as possible.

The results of the correlations for Sweden and Quebec are presented in table 5. The reliability of SES was high with correlations above 0.885 for all three of Sweden's SES constructs. TeaQua was also reliable, only SpecRed was below 0.70, but still reasonable with a correlation of 0.669. Although significant, Type had a relatively low correlation with WhatRead (0.390) whereas LitMater and InfMater had correlations of 0.687 and 0.645 respectively. HowReIns' Strategy was 0.731, During was 0.602 and After was 0.542. The correlations between the latent variables are also presented in table 4.

In Quebec, the correlation between the SES variables were weaker than Sweden, with books at 0.654 and Peduc 0.726. POccp was the same. The correlations for TeaQua were also weaker but still good. The lowest, SpecRed, was 0.616. WhatRead correlations were overall lower but the lowest value was higher than for Sweden. Type was 0.419, LitMater was 0.548, and InfMater was 0.607. The correlations for HowReIns were stronger in Quebec than in Sweden. Strategy was 0.875, After 0.701, and During 0.642.

The source of the data is also valuable in helping this study be reliable. As Gustafsson (2008) explained, the context and process in which the international

Table 5. Correlation of the variables used in the model

Variables	SESB		TeaQua		WhatRead		HowReIns		SEAS		TeachYrs		TimeRead		TimAcros	
	Swe	Que	Swe	Que	Swe	Que	Swe	Que	Swe	Que	Swe	Que	Swe	Que	Swe	Que
Books	0.885*	0.654*														
Poccp	1.000*	1.000*														
Peduc	0.899*	0.726*														
ReadEd			0.851*	0.835*												
LangEd			0.705*	0.626*												
SpecRed			0.669*	0.616*												
InfMater					0.645*	0.607*										
Type					0.390*	0.419*										
LitMater					0.687*	0.548*										
Strategy							0.731*	0.875*								
During							0.602*	0.642*								
After							0.542*	0.701*								
SESB	1*	1*														
TeaQua	0.051	0.089	1*	1*												
WhatRead	0.026	0.048	0.312*	0.301*	1*	1*										
HowReIns	-0.203	0.173	0.330*	0.498*	0.829*	0.527*	1*	1*								
SEAS	0.439*	0.508*	0.023	-0.062	0.209*	0.102	0.137	0.121	1*	1*						
TeachYrs	0.076	0.118	-0.062	0.089	0.075	0.063	0.116	0.119	0.042	0.042	1*	1*				
TimeRead	-0.069	-0.034	-0.007	0.016	0.067	0.008	0.06	-0.039	-0.1	-0.100	-0.008	-0.008	1*	1*		
TimAcros	-0.167	-0.051	0.067	0.249*	0.311*	0.111	0.257*	0.172*	0.016	0.016	0.049	0.049	0.460*	0.460*	1*	1*

\*P&lt;0.05

assessment questionnaires and tests are developed are very complex to ensure the least amount of measurement error possible. The sample being randomly selected also allows the data to be more generalizable to the whole population, in this case Sweden and Quebec students. The information gathered by the administrators of PIRLS publish the information openly making it possible for other researchers to redo the analyses and verify the results in case of doubts.

Finally, repeated measurement should usually be done using the same population. Unfortunately, making a secondary analysis of PIRLS data does not allow this possibility. However, in this study two distinct educational systems are evaluated. This creates the opportunity to verify the results of the model by comparing the two jurisdictions together.

## Results

Two models were produced during the analysis; one for Quebec and one for Sweden. The structure of the model are identical for both models, it is the strength of the relationships that differ. Although significant, the SES measured at the student level will not be discussed due to the purpose of this thesis; underlining teacher factors that are of importance in reading achievement. The student level was only used to control the effect of the students' individual SES. If of interest, the factor loadings for the student level are presented in table 6. Both models were deemed to be a good fit for the data (see table 7). The explained variance will be presented in table 8 for both countries but they will be discussed separately.

Table 6. Students' level (within level) standardised factor loadings

Dependant variable	Independent variable	Sweden			Quebec		
		Est.	S.E	Est/S.E	Est.	S.E	Est/S.E
ASRREA01	SES	0.324	0.023	14.059	0.293	0.021	13.641
SES	BookS	0.445	0.025	18.115	0.360	0.024	15.116
	PEduc	0.777	0.020	39.773	0.747	0.025	30.461
	POccp	0.683	0.020	33.393	0.609	0.025	24.633

\*All p-values < 0.001

### Sweden: General results about the model

According to the model fit information, the model was accepted. The chi-square result was 224.848 with 106 degrees of freedom (df). The critical value is 131.031. The RMSEA had an estimate of 0.017. The SRMR had a 0.061 value for the teachers' level. A perfect fit would have zero as its value. As the values for both tests are close to zero, it can be said that the model fits the data well. A CFI of a greater value of 0.95 is judged as a good model fit. In the case of this model, an estimate of 0.953 was reached.

The model was able to explain a large part of the variance due to teacher effects (79.1%). Most of the variables had a moderate to strong portion of the data explained ( $R^2$  between 0.438-0.729). In increasing order of explained variance: SpecREd (0.438), LangEd (0.482), After (0.589), Strategy (0.626), ReadEd (0.729). While others were lightly explained by the model ( $R^2$  between 0.175-0.395), Type (0.175) was the least significant explained followed by SEAS (0.191), During (0.253), InfMater (0.342) and LitMater (0.395). WhatRead was slightly explained with an  $R^2$  of 0.246. The other latent factor, HowReIns, had 55.7% of explained variance. The SES indicators' variance were highly explained by the model. PEduc was least explained with 0.892, followed by POccp (0.953) and Books (0.973). TimAcros, and TeaQua were not well-represented by the model and the explained variance was non-significant ( $p > 0.05$ ).

Table 7. Model fit test results

Test	Sweden	Quebec
Chi-square	224.848 (df 106)	135.300 (106)
RMSEA	0.017	0.008
SRMR (Between level)	0.061	0.066
CFI	0.953	0.984

Table 8. R<sup>2</sup> Values for Sweden and Quebec

Observed variable	Sweden	Quebec
	R <sup>2</sup>	R <sup>2</sup>
ASRREA01 (between level)	0.791*	0.687*
TimAcros	0.060	0.074
SEAS	0.191*	0.277*
LangEd	0.482*	0.535*
ReadEd	0.729*	0.592*
SpecEd	0.438*	0.400*
Type	0.175**	0.096
LitMater	0.395*	0.398**
InfMater	0.342*	0.381**
During	0.253**	0.371*
Strategy	0.626*	0.778*
After	0.589*	0.534*
<b>Latent Variable</b>		
TeaQua	0.000	0.004
WhatRead	0.246*	0.113
HowReIns	0.557*	0.395*

\*Significant:  $p < 0.001$ , \*\* Significant  $p < 0.05$

### Quebec: General results about the model

Quebec's data fit the model better. The Chi-square was 135.300 (df 106). The RMSEA was 0.008 and SRMR 0.066. The SRMR was marginally weaker than for Sweden. The CFI, however, is better with a value of 0.984.

Less of the data was explained by the model for Quebec. Overall, only 68.7% of ASRREA01 at the between-level was explained ( $p < 0.001$ ). Due to a p-value greater than 0.05, TimAcros and Type were judged insignificant and were poorly represented by the model ( $R^2$  was 0.074 for TimAcros and 0.096 for Type). The Strategy variable in the model had a  $R^2$  of 0.778 ( $p < 0.000$ ). ReadEd was highly explained ( $R^2$  was 0.592), followed by LangEd (0.535) and After (0.534). Five other variables were also moderately explained by the model: SpecEd (0.400), LitMater (0.398), InfMater (0.381), and During (0.371). TeaQua and WhatRead did not suit the Quebec data well and were insignificant. 39.5% of the variance was explained for HowReIns. The SES indicators' variance was explained as follows: Peduc (0.801), Poccp (0.905) and Books (0.667).

**Sweden: Factor loadings.**

In this section, the significant factor loadings for each variable in the Swedish model are presented. The insignificant factor loadings can be found in table 9 along with the other loadings. In Sweden, only SES and WhatRead were found to be significant at the second-level. SES had a loading of 0.897 and WhatRead was -0.338. SES' indicators had loadings of 0.986, 0.945, 0.976 for Books, PEduc, POccp respectively. TeaQua's ReadEd was 0.854, LangEd was 0.694, and SpecRed was 0.662. WhatRead's indicator had factor loadings of 0.584, 0.418, 0.629 for InfMater, Type, LitMater respectively. TeaQua loaded on WhatRead with a 0.290. SEAS and TimAcros were approximately the same as well with 0.253 and 0.265. Strategy (0.791), During (0.503) and After (0.767) were the indicators of HowReIns. SES had a negative effect on HowReIns with -0.237 and WhatRead was positive with 0.715. SES affected SEAS with a factor loading of 0.437 and TimAcros with -0.235. TimAcros was also affected by SEAS (0.194).

**Quebec: Factor loadings**

The factor loadings for Quebec's model are presented here. SES also had a direct effect on student achievement (0.723). TimAcros' factor loading on ASRREA01 was -0.177. Books loading for SES was 0.817, while it was 0.895 and 0.951 for PEduc and POccp. TeaQua indicators' loadings were 0.770 for ReadEd, 0.732 for LangEd, and 0.633 for SpecRed. TeaQua had an effect on WhatRead (0.277). InfMater (0.617), Type (0.310), and LitMater (0.631) were the indicators of WhatRead. HowReIns had three indicators: Strategy (0.882), During (0.609), and After (0.731). WhatRead's loading on HowReIns was 0.388, and TeaQua's loading was 0.370. SES' factor loading on SEAS was 0.526. Finally, only TeaQua was significant for TimAcros in Quebec (0.251).

**Discussion****Similarities and differences between the two countries' prescribed curricula**

As explained more in-depth in the beginning of this thesis (refer to "Background" section), both countries understand the importance of language in the society of today. They emphasise the use of the language to create meaning. Language should be used to create and to critically evaluate works and ideas. Through language,

Table 9: Standardized factor loadings for Sweden and Quebec models

Variables	ASRREA01		SESB		TeaQua		WhatRead		HowReIns		SEAS		TimAcros	
	Swe	Que	Swe	Que	Swe	Que	Swe	Que	Swe	Que	Swe	Que	Swe	Que
Books	-	-	0.986	0.817	-	-	-	-	-	-	-	-	-	-
Peduc	-	-	0.945	0.895	-	-	-	-	-	-	-	-	-	-
Poccp	-	-	0.976	0.951	-	-	-	-	-	-	-	-	-	-
ReadEd	-	-	-	-	0.854	0.77	-	-	-	-	-	-	-	-
LangEd	-	-	-	-	0.694	0.732	-	-	-	-	-	-	-	-
SpecRed	-	-	-	-	0.662	0.633	-	-	-	-	-	-	-	-
InfMater	-	-	-	-	-	-	0.584	0.617	-	-	-	-	-	-
Type	-	-	-	-	-	-	0.418	0.31	-	-	-	-	-	-
LitMater	-	-	-	-	-	-	0.629	0.631	-	-	-	-	-	-
Strategy	-	-	-	-	-	-	-	-	0.791	0.882	-	-	-	-
During	-	-	-	-	-	-	-	-	0.503	0.609	-	-	-	-
After	-	-	-	-	-	-	-	-	0.767	0.731	-	-	-	-
SESB	0.897	0.723	-	-	-	-	-	-	-0.237	0.146*	0.437	0.526	-0.235	-0.109
TeaQua	0.074*	-0.074*	-	-	-	-	0.29	0.277	0.028*	0.37	-	-	0.083*	0.25
WhatRead	-0.338	-0.070*	-	-	-	-	-	-	0.715	0.388	-	-	-	-
HowReIns	0.203*	0.177*	-	-	-	-	-	-	-	-	-	-	-	-
SEAS	0.080*	0.067*	-	-	0.015*	-0.062*	0.253	0.108*	-	-	-	-	0.194	0.119
TeachYrs	0.014*	0.046*	-	-	-	-	-	-	-	-	-	-	-	-
TimeRead	-0.006*	-0.008*	-	-	-	-	-	-	-	-	-	-	0.198**	0.488*
TimAcros	0.050*	-0.177	-	-	-	-	0.265	0.109*	-	-	-	-	-	-

\*P&gt;0.05

\*\* with ( correlation)

it is possible to understand the world. It is possible to express ideas and create meaning. Language is a cultural bearer. Students should be given all the possible opportunities to develop a love for reading and for what it provides.

The aim of the two curricula are very similar. They both aim to prepare students for a meaningful life in society; a life where they can critically take the given information rather than simply accepting it. However, both governments expressed their goals in different ways.

The Swedish programme is very descriptive. The curriculum is filled with outcomes and very few steps to reach the outcome are provided. How are students supposed to experience the Nordic culture and show their appreciation? How should they respond to texts? The details are omitted, for the better or for the worse. As the National Coordinator of PIRLS in Sweden answered in the curriculum, there are no mandatory content or method for teachers to follow. Due to the nature of the curriculum, reading processes are little emphasised. In the same way, teaching to read for specific purposes such as for reading literacy, acquiring information or for personal enjoyment are not imposed by the curriculum but rather suggested and left to the teacher's interpretation of how reading should be taught. However, students should attain a level where they can "read with, fluency, both aloud and to themselves, and understand events and meaning in books and non-fiction written for young persons, and be able to discuss their experiences from reading, as well as reflect over texts" (Skolverket, n.d.). One could say that students are required to see reading from various purposes. Omitting the steps to reach the goal has the possibility of creating discrepancies within the school system and puts more pressure on the teacher's education. The teacher is required to develop a plan on how students can achieve the goals and must find the various strategies to help them.

In opposition, Quebec's curriculum is more specific. It also allows students to experience a wide-range of texts and students are encouraged to use appropriate strategies. Though, it is clearly expressed in the curriculum that students should be shown how to use specific strategies. And, as explained in the previous section, the curriculum gives examples of specific strategies to teach. Each step to creating a critical independent reader can be found in the curriculum and can be crossed-out for every student both by the teacher and student since they are using portfolios to keep track of their work. For example, a critical reader should be able to discuss with others and compare two texts. The reader should also be able to construct meaning based on



past experiences. Evaluation wise, the teacher can see if the student is active during class activities and through the use of a book report, for example, see if the student can recount the story, compare to other readings or experiences, and explain what they enjoyed or disliked about the text read. They can also present the book within its cultural context and discuss the audience that the text was aimed at. Teacher's education therefore is not a vehicle for exploring various reading strategies but instead is beneficial for exploring how to teach the strategies most efficiently.

### **SES, opportunity to learn and reading achievement**

The model for Sweden was able to explain 79.1% of the variance for reading achievement while Quebec's model explained 68.7%. Only the classroom's SES has direct significant effects on both countries. The effect of SES is strongest in Sweden. The latter has a policy, since 1992, that allows students and their primary caregivers to select the school of their choice, both in the private and public sector. Schools are subsidised according to student enrollment (Lindblad, Lundahl, Lindgren, & Zackari, 2002). Although no teacher differences have been found between the two types of schools, it has led to more competition between them and created a stronger segregation based on SES in the educational system (Myrberg & Rosèn, 2006). They found that independent schools tend to have better reading scores than their public counterparts. This is mainly due to the fact that these schools tend to have students with a more favourable SES background. When SES was controlled, no significant differences were found. This is in line with what Coleman and his colleagues reported, as discussed earlier (Coleman, et al., 1966). Students and their families, when given the opportunity, prefer to be surrounded by people that are the same as they are and therefore schools are often representative of SES. Student background cannot be taken for granted when analysing student achievement.

The time spent on reading across the curriculum was significant for Quebec. Although the direct effects were insignificant in Sweden, the indirect effects were significant but minor. The factor loading was negative for this factor. In order to provide an equal educational opportunity to every pupil, the school must palliate the differences that students enter the school system with. By increasing the exposure to written texts regardless of the subject in school allows students to encounter a wide range of texts. Students are given the opportunity to learn and engage with reading. The opportunity given during school time allows them to develop the necessary tools

to become more proficient readers (Guthrie, Schafer, & Huang, 2001; Lafontaine, Baye, Vieluf, & Monseur, 2015). Students with a higher SES background may already have the necessary support and opportunities to learn at home. Therefore, the time spent reading in school does not affect them as much as their comrades with lower SES.

The SES background can also explain the negative effect of the choice of literature read (WhatRead) in Swedish schools. Just as it was previously discussed, students must be given the opportunity to learn. Since the number of books used at home is a variable used for determining a student's SES, it can be said that lower SES can be indicated by a lack of reading resources at home. It is not to say that they do not have any reading material but it may be limited to a few genres, for example. Schools thus provide students the chance to experience a greater range of texts. It provides them with opportunities to familiarise themselves with various texts and understand how to handle them and understand the content. Since the effects of SES are stronger in Sweden, this may explain why the results were significant for Sweden but not for Quebec.

### **Teacher qualification and reading material**

The latent variable "TeaQua" was well represented by its three indicators (reading education, language education, and special education in reading). In Sweden, although all three indicators' factor loadings were high, reading education was the most important in describing teacher qualifications. Language education and special education in reading were also valuable but not as much. If there are any causal links between teacher qualifications and student achievement that could be made in the future, then teacher training in reading should be analysed furthermore. Since the goal of formal education in teaching reading is to prepare future teachers know how to facilitate the learning of reading, it is not surprising that this is the strongest indicator. Although the other two indicators may also help teachers understand the complexity of reading, teachers with greater training in teaching have better skills to adapt to the students' needs (Darling-Hammond, 2000). Knowledge about the subject is important but knowing how to deliver the content matter is also important.

Teacher qualifications gained through education is significant for a teacher's first years, but teaching experience compensates afterwards for lacks in education (Goldhaber, Liddle, & Theobald, 2013). Reading achievement could be improved up to two times as much as expected if teachers' formal education was one of the most

effective studied. The researchers also underlined the fact that teacher education seemed to be more important for reading than for math. They suggest that this may be due to more time being spent during the education on reading than math but did not study the question further in the context of the study. Although no significant links were made for teacher experience in this study, Goldhaber, Liddle, and Theobald's study leads to the same conclusion: formal reading training for teachers can be a source to help students progress in their reading abilities.

Formal reading education was also the highest indicator of teacher qualification in Quebec but the result was more modest. The range between the three indicators was smaller (between 0.633 and 0.770). In comparison to Sweden, more importance was given to formal language education. Since schools in Quebec seem to have less segregation with regards to students' SES backgrounds, it is plausible for language education in general be more important for teachers. Having a greater range of SES in the same classroom implies that students' range of basic knowledge varies and more differentiation needs to take place in order to satisfy the needs of every student. A teacher would therefore need greater knowledge about the language and how to assess it (Damber, Samuelsson, & Taube, 2011; Phillips, 2010). In both studies, teacher's education was only found to be slightly valuable. For Phillips, teacher's education was significant only if the education was specific to the subject taught whereas in the other study, teacher's education was only meaningful when SES was not controlled.

The choice of the literature used in class was affected by TeaQua for both Sweden and Quebec. Both had approximately the same strength in relation. Another aspect that should be considered when interpreting the results of WhatRead is the guidance provided by the Quebec government in selecting reading resources. Although teachers have some control to decide the reading material they wish to use like in Sweden, in Quebec, teachers must choose from a predetermined list. The slightly weaker relationship between TeaQua and WhatRead may be due to this. Teacher's knowledge about reading instruction is not as important when choosing the reading material if the readings chosen were already preapproved to be of good value. However, the teacher's knowledge about reading pedagogy, assessment, the language itself and special education helps them adapt appropriately to their students.

Moreover, in Sweden, SEAS and TimAcross also had a significant effect on WhatRead. As explained earlier, free schools in Sweden may create segregation

where higher SES students choose to attend “better” schools and therefore lower SES students end up together. The model demonstrated that SEAS is influenced by SES to a great extent. If students are supported by teachers and parents, and they themselves believe in their capacity to achieve better, students will be more inclined to work harder in school (Mullis I. V., Martin, Foy, & Drucker, 2012). With this in mind, teachers in classes with higher SEAS may be able to diversify the choice of reading material. Another explanation, although not tested by the model, is the classroom management required. If classes have a high SEAS, they tend to be more disposed to learning (Damber, Samuelsson, & Taube, 2011; Mullis I. , Martin, Kennedy, Trong, & Sainsbury, 2009; Nilsen & Gustafsson, 2014) and thus less time must be spent classroom management and contacting parents in response to misbehaving problems, leaving more time for opportunities to learn and to experience a wider range of literature. For example, reading a novel will require more time than reading a short poem or article.

TimAcross effects on WhatRead may be due, as explained for SEAS, to classroom management. When there are less interruptions during lessons, teachers and students are able to focus more on learning rather than on off-task behaviour (Ratcliff, et al., 2010). In other words, the teacher and students are able to concentrate on reading tasks more efficiently thus completing the required curriculum faster and allowing for more variety in the choice of material used.

### **How reading instruction is conducted in the classroom**

More than half (55%) of the variance of HowReIns was explained by the model for Sweden and 39% in Quebec. The choice of reading material had a strong effect on this factor in Sweden but only approximately half as strong in Quebec. However, TeaQua was as important and significant in Quebec but not in Sweden. The Swedish results were interesting. It was expected that teacher qualification would be more significant in Sweden in comparison to Quebec due to the vagueness of the curriculum. One possible explanation is that although Quebec’s curriculum is detailed, teachers may not necessarily understand all the contents and therefore the education is important for them to understand how to work with the official document. The education guides teachers in their teaching practices that are heavily based on the curriculum. In opposition, the Swedish curriculum only expresses the goals and so teachers can rely on their own understanding and skills rather than education to prepare meaningful activities for the students. Since they are not obliged

to see a large panoply of strategies, teachers may possibly choose strategies and activities with which they feel more confident teaching.

The choice of reading material highly affects the reading activities done in class in Sweden but only slightly in Quebec (0.715 in comparison to 0.388). As explained in the previous paragraph, Quebec's curriculum is more specific to what skills students should develop at every stage of their learning. Therefore, there is less place for variation of reading material and instruction activities. Although the curriculum is still open for some interpretations, it is similar to a checklist. They must still apply the correct instruction activity based on the reading material used but the activities are more controlled. Whereas, it could be said that teachers are more trusted in Sweden and therefore they may adapt their teaching more to their classroom situation.

SES effect on HowReIns is negligible and insignificant in Quebec but not in Sweden. It can be thought that classrooms with lower SES have a need to alternate more in the learning activities to palliate for the lack of support from home (see previous discussion about SES and reading earlier).

As it was expected based on the reading and comparison of the two curricula, Quebec's focus on reading strategies is more important than in Sweden. Teaching strategies and showing them when to use different strategies help students gain reading independence, hence improving their reading achievement (Castillo & Bonilla, 2014; Cunningham, 1986). Although strategies was a high indicator of the factor in Sweden as well, it was not as high. This may be a result of the curriculum not explicitly helping teachers underlining the important strategies that should be taught to students. Quebec's higher effect of teacher qualification on HowReIns may result from teachers having better tools to help students and evaluate their needs therefore differentiating more efficiently. This is in accordance to the Dynamic Model which highlights the need for differentiation at the classroom level (Creemers & Kyriakides, 2008).

The activities done after reading such as reading responses and tests were relatively the same in both countries. They were high indicators of HowReIns. Having students react and work with reading texts by answering questions or responding is common practice and if done effectively it helps students in their reading development (Duke & Pearson, 2008/2009). The results of the current study suggest that teachers should continue doing so. In contrast to Sweden, Quebec seems to focus

more on activities during the actual reading process as well. Although HowReIns was not deemed directly significant for student's reading achievement, the difference in activities done during reading may still be of importance.

### **Time spent on reading**

Time spent during the prescribed scheduled reading time was not significant for either countries and was therefore eliminated from the model when the model was revised. Earlier, it was mentioned that students need to be given the opportunity to learn. Originally, it was expected for TimeRead to be significant for this reason. However, upon reflection, the results are plausible. The curriculum prescribes a minimum amount of time students should be exposed to core subjects such as mathematics and language education. Although there may be variation in the amount of time spent on reading between countries, the variation should be relatively low due to regulations within the country. Variations in time spent on reading should therefore lie in time spent across the curriculum. In Quebec, the teacher qualification variable was the only variable to affect TimAcros. The TeaQua variable was based on the teacher's education. The results were not alarming, as awareness and knowledge about reading development gain through education should influence teacher practices. More surprising, was the non-significant score for the same variable in Sweden. Further research should be made to understand the relationships between teachers and their practices in Sweden.

In Sweden, only SES and SEAS had a significant effect on TimAcros. The SES effect was negative and the SEAS was positive but the effects were moderate (0.194). It was expected after analysing the interaction of SES with the other factors. As mentioned earlier, it would be of interest in the future to add components of time management, class discipline management, in the model and analyse the paths again.

### **Limitations**

The model failed to highlight teacher-related factors that are related to students' reading achievement scores. Although Myrberg (2007) used slightly different aspects of teacher characteristics, she also failed to underline significant teacher factors. Her study was based on the PISA 2009 dataset, an international test in partnership with the PIRLS developer. As Myrberg suggests, it is not impossible that the teacher factors evaluated are significant for students' reading achievement. The researchers dealing with the PISA and/or PIRLS dataset have access to a large dataset. However, they do not have the opportunity to compliment the questionnaires to adjust

to their needs. A questionnaire developed specifically for evaluating teacher-factors would most highly be more sensitive to class differences.

The structure of the factors may be the reason for the few significant results. For the purpose of this study, it was decided to parcel the indicators into small groups. However, Little, Cunningham, Shahar and Widaman (2002) cautions against parcelling, meaning that the researcher intending to parcel should have a good understanding of the dimensionality of the items. Although the reliability between the items were high, it is possible that the items' natures were not fully understood. This in turn could cancel some of the effects that would have been there had the items not been parcelled.

### **Summary and implications:**

Students' initial socio-economic background with which they enter school is the most important in determining their probabilities to success. Schooling and teaching act as compensatory factors for the lack of support received from home (students with low SES benefit from the teaching provided in school more than students with high SES backgrounds). The time spent reading across the curriculum provides students with opportunities to learn and may increase their chance to be successful readers. This was especially true in Quebec, where the results were significant. The reading material chosen, was the factor that was significant in Sweden. Since no variable apart from SES was significant as a direct effect for reading achievement for both countries, it is impossible to conclude that any one factor is directly affecting reading achievement for both countries. However, teacher qualification have effects on teacher's choice of reading material in both countries. The reading material is also determinant in the choice of reading activities done during class time. SES effects SEAS positively for both countries.

In Quebec, teacher quality also affected the choice of reading activities done and the time spent on reading across the curriculum. In comparison with Sweden, teacher qualification is more important as it influences classroom practices to a greater extent.

Sweden seems to be more affected by affectional and sociological variables. SES is significant directly on reading achievement, reading activities, school emphasis on academic success and the time spent on reading across the curriculum.

People's view on academic success was also influential for the choice of reading material and reading time across the curriculum.

*Future research.* Creemer and Kyriakides' dynamic model could not be confirmed with the results of this study. However, it does not mean that the model is invalid. The researchers discussed in their text about comparative studies such as PIRLS and pointed to the different nature of the model and studies (Creemers & Kyriakides, 2008). PIRLS is not built to detect educational effectiveness factors as a main purpose, therefore it is impossible to test all the aspects of the dynamic model using the data offered by the comparative study. PIRLS questionnaires, or new studies, should be especially design to measure teaching practices and their five dimensions. Since HowReIns almost reached significant levels, a more closely designed study could reveal the factor to be significant.

*National level.* Striving for a good teacher education is important as their practices are influenced by their education. Teachers should have a good theoretical foundation in reading education and also the language of teaching. Teacher qualification helps teachers take decisions as to the time spent on reading across the curriculum. Policies should be made to ensure that future teachers are educated as effectively as possible and are prepared for their future careers.

*Classroom level.* The choice of reading material (informational and literary texts) is more important than the actual source of information (textbooks, magazines, etc.). Teachers should continue to teach students how to use strategies and pick the activities done afterwards carefully. Although the activities done during reading are also important, they are not as determinant. Teachers should adapt their instruction activities based on teaching material used and to the group they have.



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